Instruction Manual

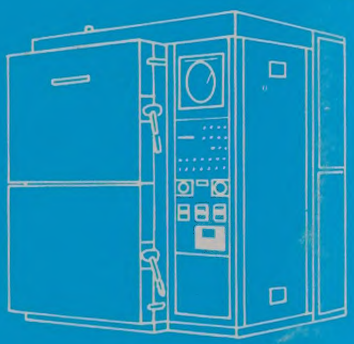
—For—

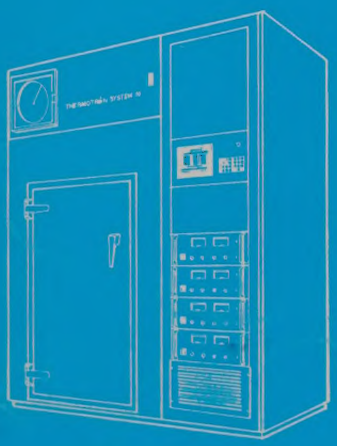
Thermotron Industries Testing System

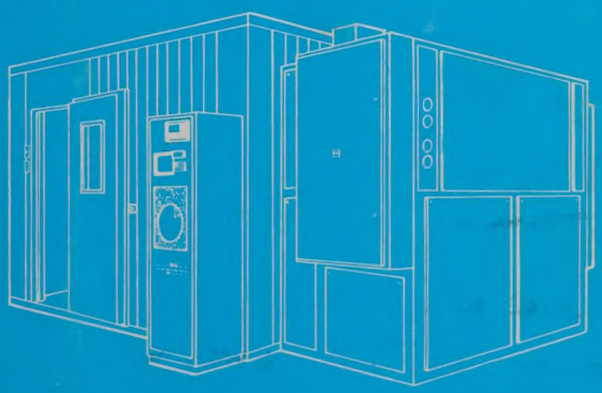
PS-4000

Serial No. ~~S.O. 28-1638~~
(~~For 28-837C~~)

THERMOTRON







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THERMOTRON

VIBRATION TESTING SYSTEM

MODIFICATION SUPPLEMENT

Serial No. S.O. 28-9638

Mod. To 28-8376

Technical Publications
Product Support Department
THERMOTRON INDUSTRIES
291 Kollen Park Drive
Holland, MI 49423
Phone: (616) 392-1491

JOB 28-9638 MODEL REMOTE ALARM SYSTEM VOLTAGE 115/1/60 T.W. SHEET 1 OF

OPERATION ELECTRICAL ASSEMBLY MONITOR BOX B/M S.O. 009638

SYMBOL	DISCRIPTION	MFG	PART NO	THERM NO	QTY
BOX	NEMA 12 ENCLOSURE 16"x14"x6"	HOFFMAN	A-1614CH	565072	1
PANEL	MOUNTING PANEL 14"x12"	HOFFMAN	A-16P14	612693	1
TB 1	TERMINALS	SQUARE D	9080KCA1	565412	26
TB KIT	TERMINAL END KIT	SQUARE D	9080K1	590355	1
T 1	TRANSFORMER 40VA 120V/24V	PENN	Y65AS1	598615	1
F 1	FUSE	BUSS	AGC-3/4	544423	1
FUSE HLDR	FUSE HOLDER	BUSS	HKP	241005	1
CR 1-8	CONTROL RELAY 24 VAC DPDT	P & B	KAP11AY	605239	8
SOCKET	RELAY SOCKET	CURTIS	RS8-SC	567814	8
PB 1-4	PUSHBUTTON SWITCH (N.O.)	C H	8411K12	565722	4
R	NEON INDICATOR BOX	IND DEV	1050QA1	566109	5
A	SONALERT ALARM 115V	MALLORY	SC110	562014	1
TAB	ITEM: 101,(2)1108,(2)1109,(4)1269,1301, 1302,1309	THERMOTRON	2901	544320	1 EA

DESIGNER
ROGER COOK
W.O.
JOB
DATE ISSUED
DEC 02 1982 9638

THERMOTRON CORPORATION

JOB 28-9638 MODEL REMOTE ALARM SYSTEM VOLTAGE 115/1/60 SHEET 2 OF 7

OPERATION ELECTRICAL ASSEMBLY STATUS PANEL(2) B/M

SYMBOL	DESCRIPTION	MFG	PART NO	THERM NO	QTY
BOX	CONTROL PANEL,TOP,SIDES & BOTTOM	THERMOTRON	DS-3010(X)	531879	2
PANEL	FRONT STATUS PANEL	THERMOTRON	DS-3045-9638(W)		2
J 1	BNC BULKHEAD CONNECTOR	AMPHENOL	31-010	548666	2
TB 1	TERMINAL STRIP	CINCH-JONES	20-141-Y	568438	2
TD 4,TD 5	TIME DELAY RELAY (3-RANGE)	ATC	319D134Q1C	563169	4
SOCKET	RELAY SOCKET	CURTIS	RS8-SC	567814	4
1 CR-10CR	CONTROL RELAY 4PDT	P & B	KHU17A11	568845	20
SOCKET	RELAY SOCKET	CURTIS	RS-15	567830	20
R	INDICATOR LAMP	LEECRAFT	32R2911T	567490	10
PB 1	PUSHBUTTON SWITCH (N.O.)	C H	8448K2	631191	2
A	SONALERT ALARM	MALLORY	SC110	562014	2
	STUD,SELF CLINCHING	PENN	FH-032-8C1	597511	8
	WASHER,FLAT #10	STOCK	532972S	532972S	8
	WASHER,SPLIT LOCK #10	STOCK	532883S	532883S	8
	NUT,HEX #10-32	STOCK	533022S	533022S	8
PS	POWER SUPPLY ±15VDC	THERMOTRON	I-2068K(Y)	660884	2
	STANDOFF 1/2"	STOCK	577593	577593	8
	MACH. SCREW #6-32x3/4"	STOCK	541017S	541017S	8
	WASHER,FLAT #6	STOCK	538490S	538490S	8
	WASHER,SPLIT-LOCK #6	STOCK	538407S	538407S	8
	NUT,HEX #6-32	STOCK	538571S	538571S	8
TABS:	ITEMS: 101,1303,1304,1305,1306,1307,1308	THERMOTRON	2901	544320	2 EA
TABS	ITEM: 187	THERMOTRON	2902	544320	2
CABLE	BNC CABLE 8'	STOCK	541350	541350	2
TB 2	TERMINAL STRIP	CINCH-JONES	6-141-Y	609498	2

JOB 28-9638 MODEL REMOTE ALARM SYSTEM VOLTAGE 115/1/60 SHEET 3 OF 7

OPERATION ELECTRICAL ASSEMBLY STATUS PANEL(2) B/M

SYMBOL	DESCRIPTION	MFG	PART NO	THERM NO	QTY
VS	VIBRATION LOW LEVEL SWITCH	THERMOTRON	I-2082-QQ(X)		
TB	TERMINAL STRIP	CURTIS	EPCR-9	176005	2
SOCKET	8 PIN DIP SOCKET	STOCK	175008	175008	2
SOCKET	14 PIN DIP SOCKET	STOCK	175004	175004	2
K	REED RELAY 5VDC SPDT	GORDOS	831C-2	111001	2
IC	OP AMPS	NATIONAL	LM358N	093021	2
Q 1	TRANSISTOR	NATIONAL	2N2222	083015	2
R 1	TRIM POT 1K OHM	STOCK	054002	054002	2
R 2	RESISTOR 14 K OHM/1/4W	STOCK	052415	052415	2
R 3	RESISTOR 1 K OHM/ 1/4W	STOCK	052301	052301	2
R 4	RESISTOR 330 OHM/1W	STOCK	051238	051238	2
BOARD	P.C. BOARD	THERMOTRON	I-2082(X)	527790	2/3

JOB 28-9638 MODEL REMOTE ALARM SYSTEM VOLTAGE 115/1/60 SHEET 4 OF

OPERATION ELECTRICAL ASSEMBLY SHAKER CONSOLES MODIF. (2) B/M

SYMBOL	DESCRIPTION	MFG	PART NO	THERM NO	QTY
TB 2	CONTROL TERMINALS	SQUARE D	9080KCA1	565412	6
PANEL	BLANK PANEL 19"x12¼"	THERMOTRON	1923-11A	574373	2

SHIPS WITH JOB

JOB 28-9638 MODEL REMOTE ALARM SYSTEM VOLTAGE 115/1/60 SHEET 5 OF 7

OPERATION ELECTRICAL ASSEMBLY CHAMBER CONSOLE MODIF.(2) B/M

SYMBOL	DESCRIPTION	MFG	PART NO	THERM NO	QTY
CR 2A	CONTROL RELAY	STOCK	568799	568799	2
SOCKET	RELAY SOCKET	CURTIS	RS8-SC	567814	2
TRACK	RELAY TRACK(2")	CURTIS	TR-2	559463	2
TB B	TERMINAL STRIP	CURTIS	E-2	553066	2

SHIPS WITH JOB

JOB 28-9638 MODEL REMOTE ALARM SYSTEM VOLTAGE 115/1/60 SHEET 6 OF 7E

OPERATION ELECTRICAL ASSEMBLY INTERCONNECT B/M

SYMBOL	DESCRIPTION	MFG	PART NO	THERM NO	QTY
	#14 THHN WHITE WIRE			575493	50'
	#14 THHN RED WIRE			575531	500'
	2-CONDUCTOR INSTRUMENT CABLE	ALPHA	1172	562472	50'

SHIPS WITH JOB

THERMOTRON CORPORATION

JOB 28-9638 MODEL REMOTE ALARM SYSTEM VOLTAGE 115/1/60 SHEET 7 OF 7E

OPERATION ELECTRICAL ASSEMBLY RED-LINE DRAWING B/M

SYMBOL	DESCRIPTION	MFG	PART NO	THERM NO	QTY
EL1141-8376(W)	DS-4000 ELECTRICAL PRINT (JOB 8376)				1
EL1142-8376(W)	DS-4000 SYSTEM INTERCONNECT (JOB 8376)				1
EL1141-8377(W)	DS-4000 ELECTRICAL PRINT (JOB 8377)				1
EL1142-8377(W)	DS-4000 SYSTEM INTERCONNECT (JOB 8377)				1
E-22-8379-1(W)	F-144-CHV-25-25-S ELECTRICAL SCHEMATIC (JOBS 8379 & 8380)				1

SHIPS WITH JOBS

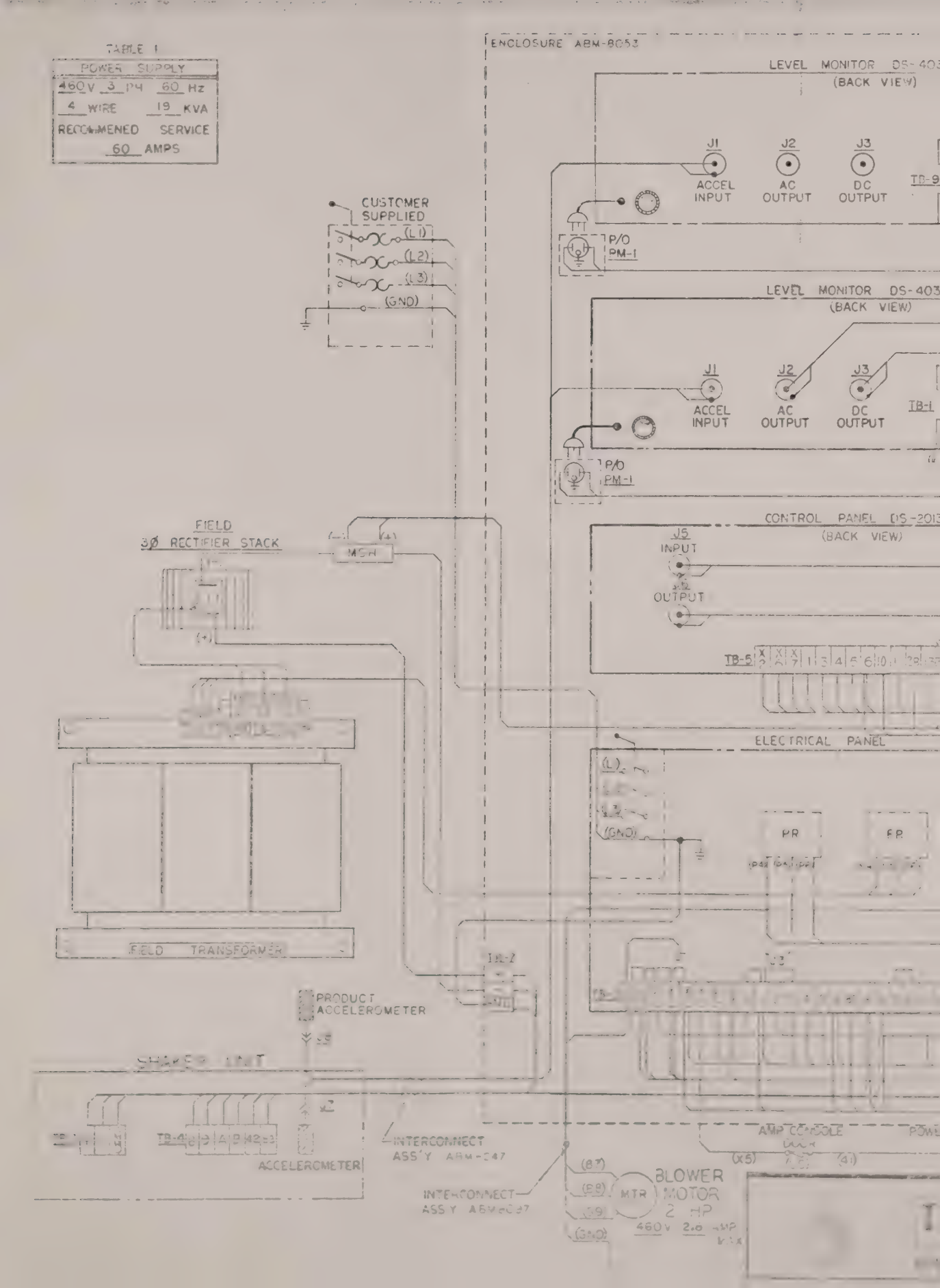
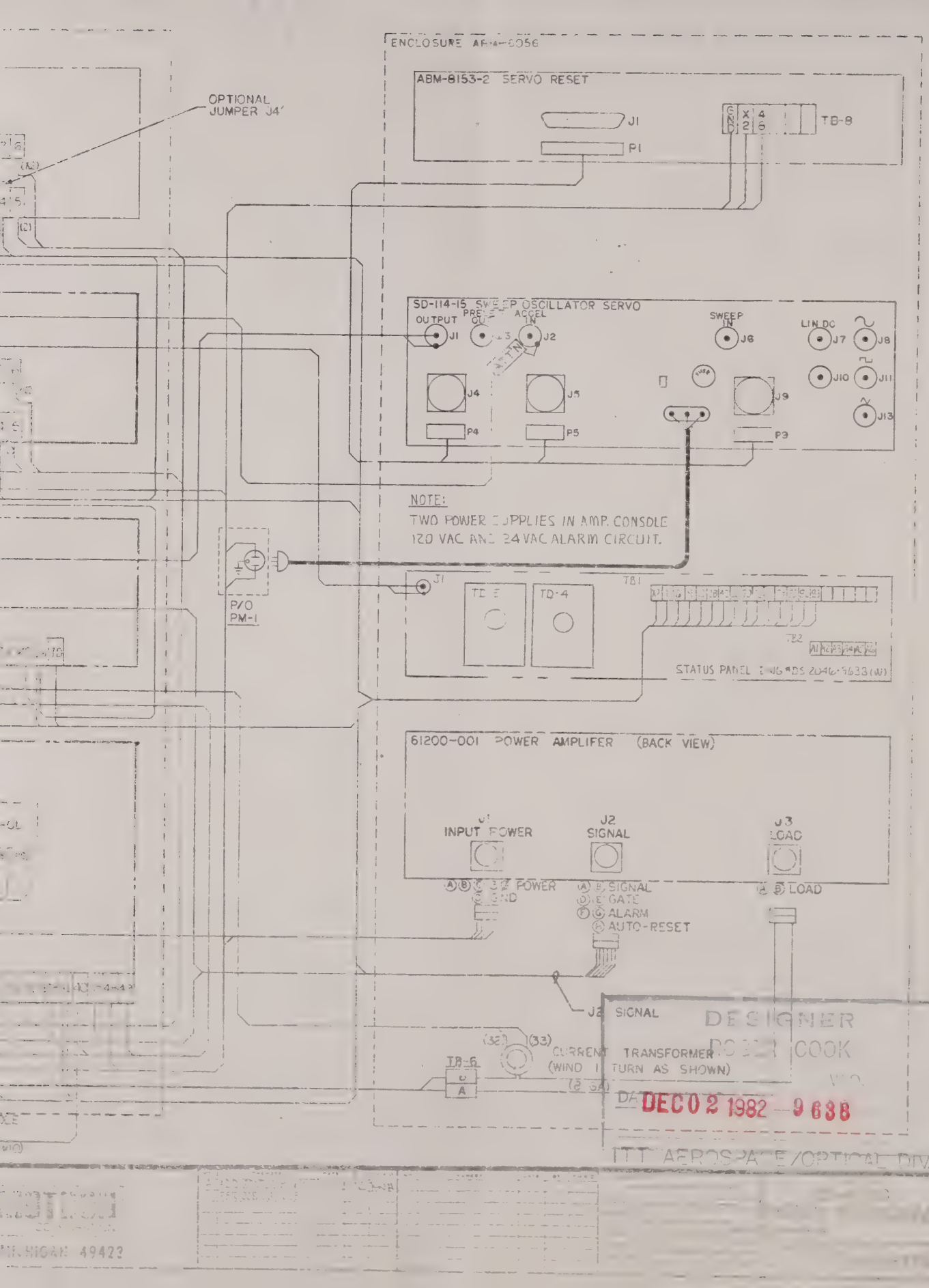
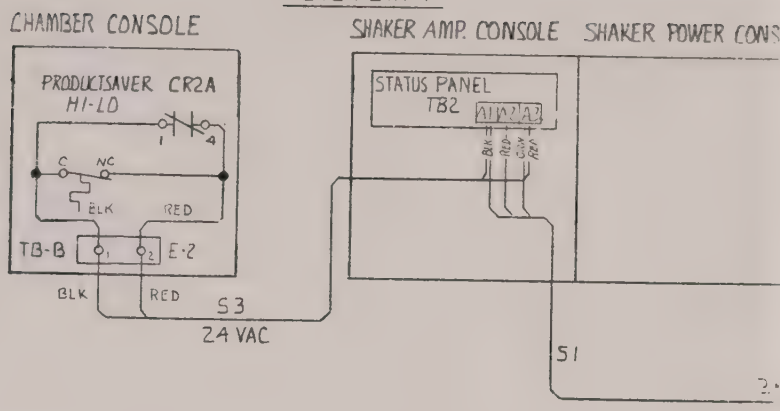


TABLE 1
POWER SUPPLY
460 V 3 PH 60 Hz
4 WIRE 19 KVA
RECOMMENED SERVICE
60 AMPS
ENCLOSURE ABM-8053
LEVEL MONITOR DS-403
(BACK VIEW)
J1
ACCEL INPUT
J2
AC OUTPUT
J3
DC OUTPUT
TB-9
P/O PM-1
CUSTOMER SUPPLIED
(L1)
(L2)
(L3)
(GND)
LEVEL MONITOR DS-403
(BACK VIEW)
J1
ACCEL INPUT
J2
AC OUTPUT
J3
DC OUTPUT
TB-1
P/O PM-1
CONTROL PANEL DS-2013
(BACK VIEW)
J5
INPUT
J6
OUTPUT
TB-5
FIELD
3Ø RECTIFIER STACK
MSH
ELECTRICAL PANEL
(L)
(GND)
PR
FR
FIELD TRANSFORMER
PRODUCT ACCELEROMETER
SHAKER UNIT
TB-4
ACCELEROMETER
INTERCONNECT ASS'Y ABM-047
INTERCONNECT ASS'Y ABM-047
BLOWER MOTOR 2 HP
MTR
460V 2.0 AMP
AMP CONSOLE
(X5)
(41)


ENCLOSURE AB-4-6056
ABM-8153-2 SERVO RESET
J1
P1
GND
X
4
2
6
TB-8
OPTIONAL JUMPER J4'
SD-114-15 SWEEP OSCILLATOR SERVO
OUTPUT
PREV. OUT
ACCEL IN
J1
J2
J3
SWEEP IN
J6
LIN DC
J7
J8
J10
J11
J13
J4
J5
J9
P4
P5
P3
NOTE:
TWO POWER SUPPLIES IN AMP. CONSOLE
120 VAC AND 24 VAC ALARM CIRCUIT.
P/O PM-1
J1
TB1
TD-3
TD-4
TB2
STATUS PANEL
61200-001 POWER AMPLIFIER (BACK VIEW)
J1 INPUT POWER
J2 SIGNAL
J3 LOAD
POWER
GND
SIGNAL
GATE
ALARM
AUTO-RESET
LOAD
J2
SIGNAL
(32)
(33)
CURRENT TRANSFORMER
(WIND 1 TURN AS SHOWN)
TB-6
U
A
DESIGNER
ROGER COOK
DEC 02 1982 9638
ITT AEROSPACE/OPTICAL DIV.

SYSTEM-1



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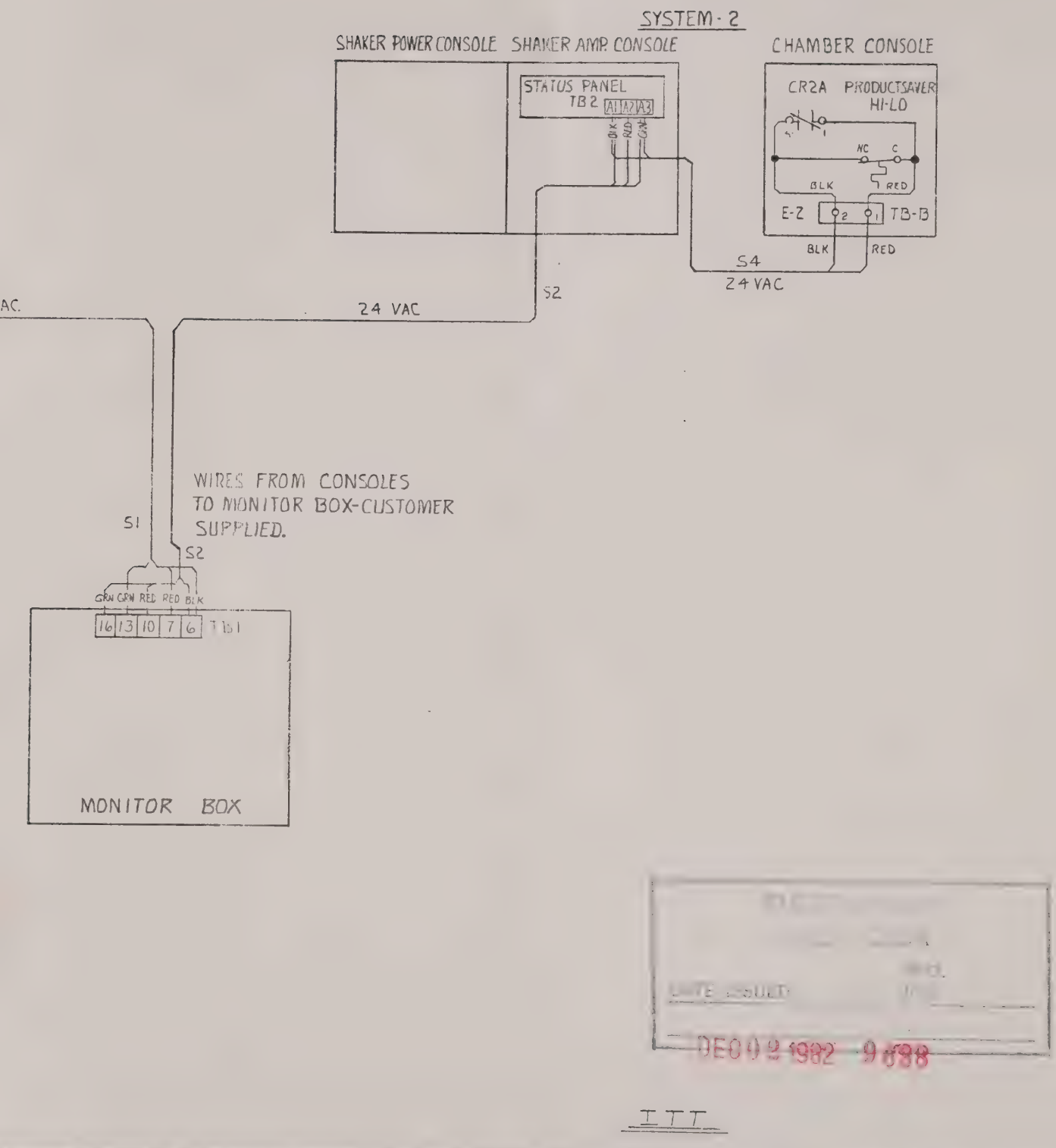
HOLLAND, MICHIGAN 49423



DEC 02 1982

ITT

CHANGES	BY	DATE	CHK'D

TOLERANCE

SCALE

MATERIAL

FINISH

DESCRIPTION
SYSTEM INTERCONNECT
REMOTE ALARM SYSTEM

DRAWN BY

DATE

CHECKED BY

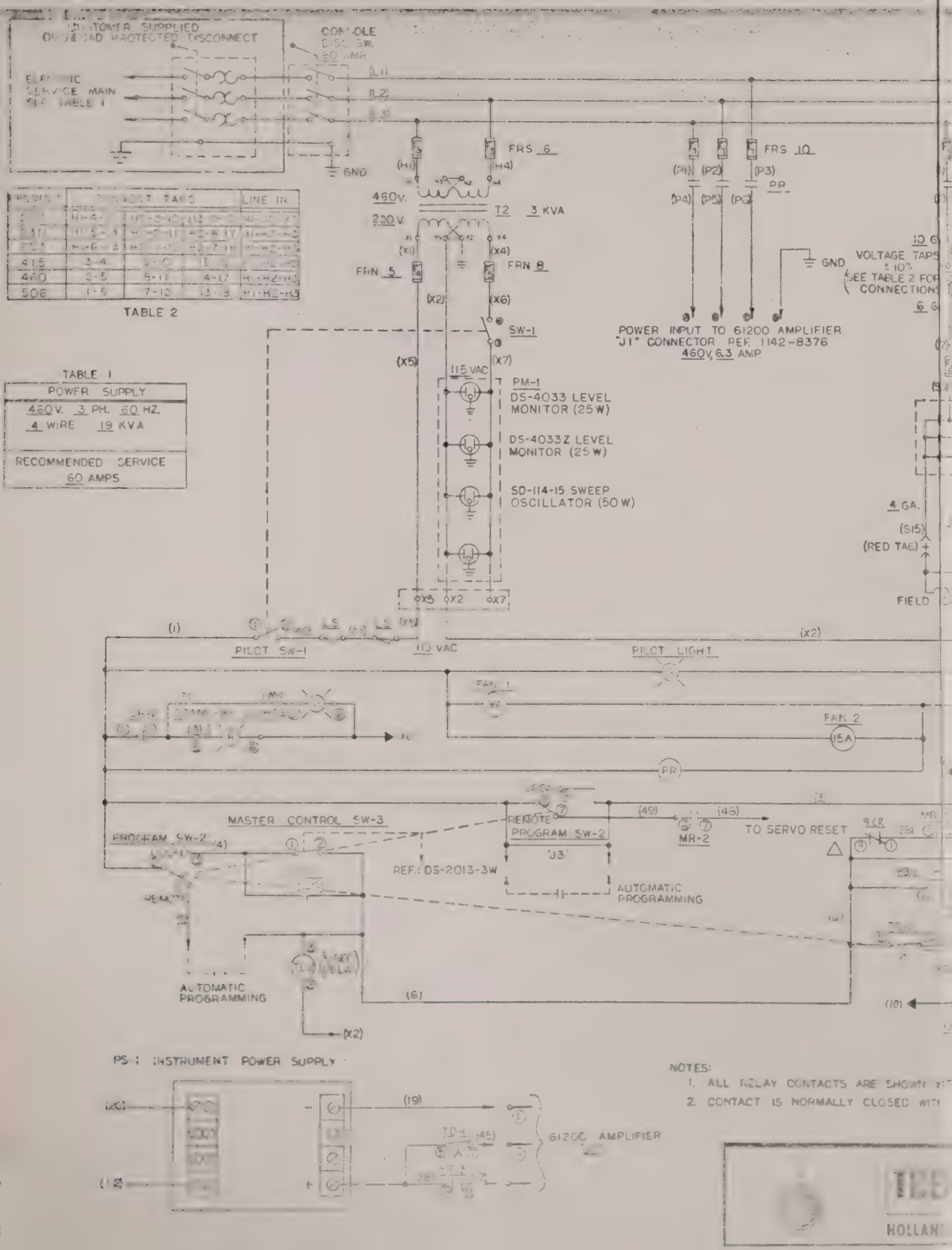
DATE

RELEASED BY

DATE

DRAWING NO

SIZE
X



	TAPS	LINE IN
230	1-4	H1-H2
415	3-4	H2-H3
460	2-5	H1-H2-H3
506	1-6	H1-H2-H3

TABLE 2

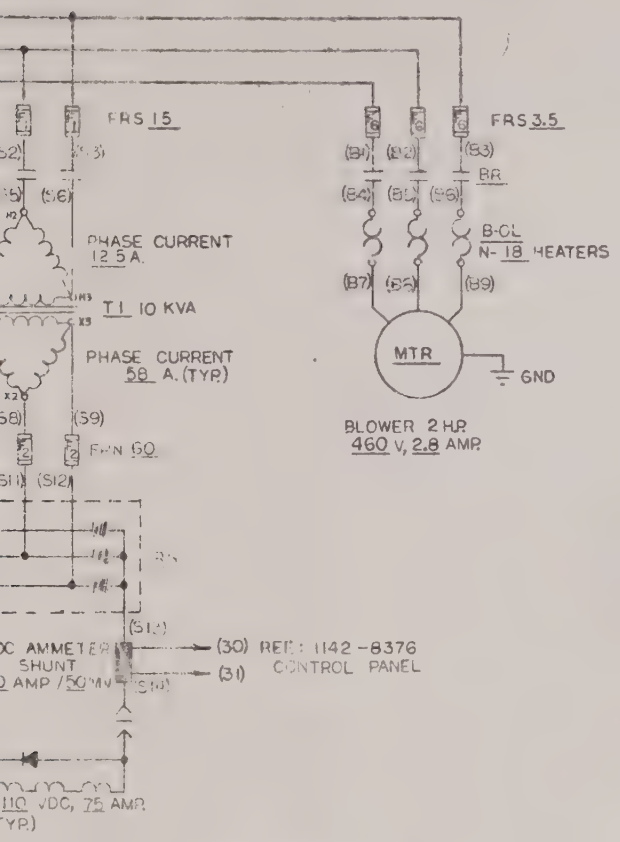
TABLE 1

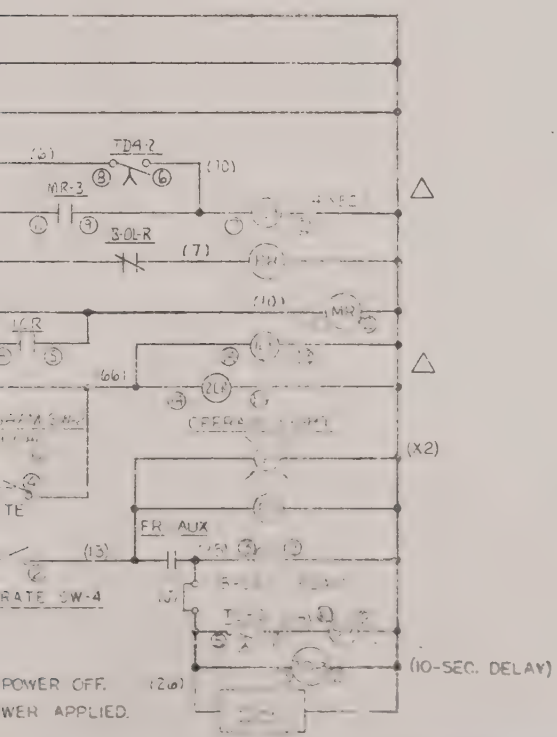
POWER SUPPLY
460 V. 3 PH. 60 HZ.
4 WIRE 19 KVA
RECOMMENDED SERVICE
60 AMPS

NOTES:
1. ALL RELAY CONTACTS ARE SHOWN
2. CONTACT IS NORMALLY CLOSED WI

HOLLAN

PART NO.	DESCRIPTION DS-4000/460V	QTY.
533642	Disconnect Switch - 60 Amp.	1
533650	No Fuse Kit for Above	1
71010	Ground Lug Terminal T & B - 2/0	1
9080CA-35	Assembled Terminal Block	1
545101	Fuse, Blower "F6" - 3½ Amp/600V	3
545268	Fuse, Field Supply "F1" - 15 Amp/600V.	3
576112	Fuse, Field Supply "F2" - 60 Amp/250V.	3
545144	Fuse, Control Transf. "F3" - 6 Amp/600V.	2
576228	Fuse, Control Circuit "F4" - 5 Amp/250V.	1
576252	Fuse, Control Instrument "F5" - 8 Amp/250V	1
576279	Fuse, Power Amp. "F7" - 10 Amp/600V.	3
553228	Fuse Block, 3 Pole/30 Amp/600V.	3
553201	Fuse Block, 2 Pole/30 Amp/600V.	1
553252	Fuse Block, 2 Pole/30 Amp/250V.	2
553325	Fuse Block, 3 Pole/60 Amp/250V.	1
500096	Contactor - 3 Pole/30 Amp - "BR", "FR", & "PR"	3
570823	Aux. Contact, N.O.	2
569043	Time Delay Relay, N.C., 5 Sec. "TD-2 & TD'1"	2
569051	Time Delay Relay, N.O., 10 Sec. "TD-3"	1
568802	Relay - "SR" & "MR" (P&B)	2
567822	Relay Socket - "MR" & "SR"	2
567814	Relay Socket - "TD"	1
557738	Overload Station (A-B)	1
559811	Overload Heaters "N18" (A-B)	3
535914	Control Transformers 3 KVA	1
565250	Field Transformer 10 KVA 460/230V.	1
533421	Simpson Shunt	1
594075	Rectifier Assembly	1
526200	Master Gain "SW-3"	1
565838	Local/Remote Switch "SW-2"	1
565765	Operate Standby Switch "SW-4"	1
565773	Pilot Switch "SW-1"	1
566109	Lamp "R"	4
527324	Fan Caravel	1
571390	Micro Switch Door "LS"	2
561646	Power Outlet Strip	1
	Cooling Blower - 2 H.P. - 3600 RPM TEFC - 145 Frame -	1
526638	Air Switch "AS"	1
527332	Muffin Fan	1



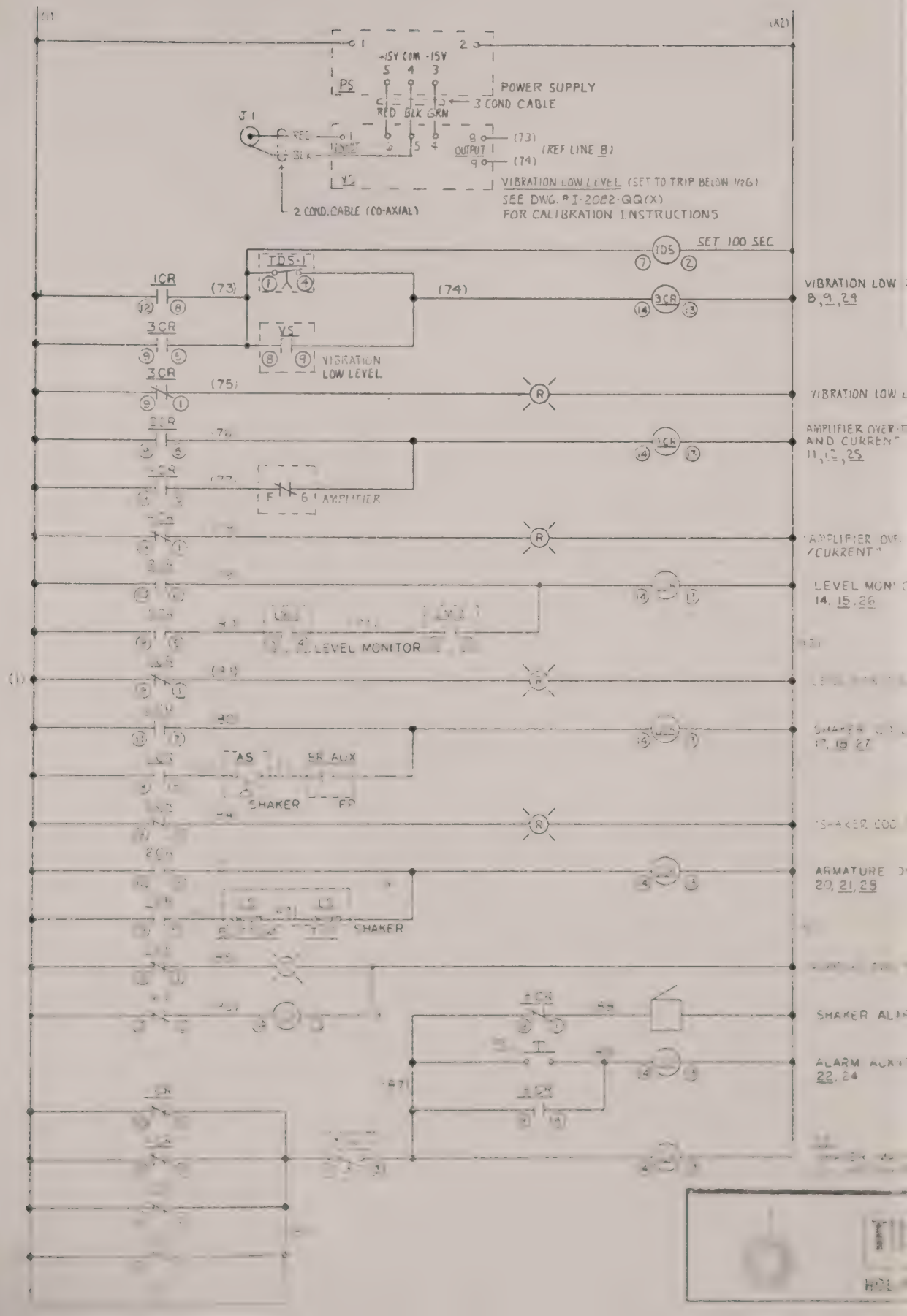


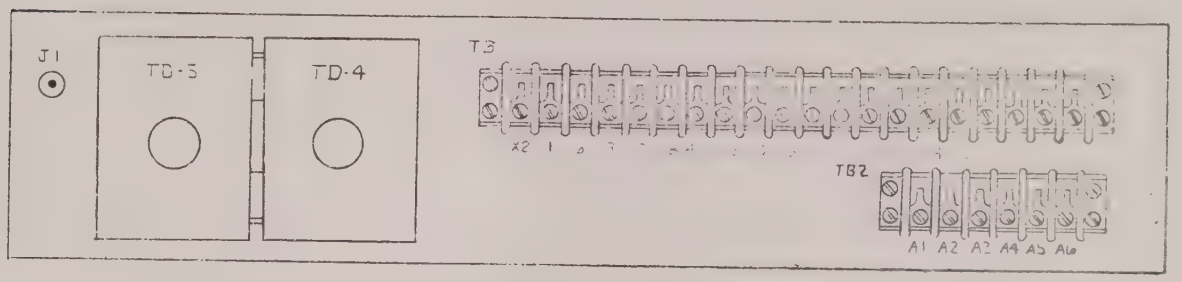
△ REF. STATUS PANEL DWG. # DS-2046-9638 (W)

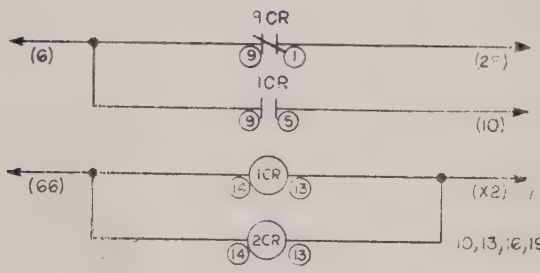
DESIGNER
ROGER COOK
W.O.
DATE
DEC 0 2 1982 9638

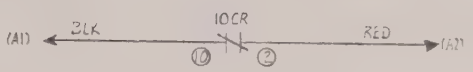
ITT AEROSPACE/OPTICAL DIV.

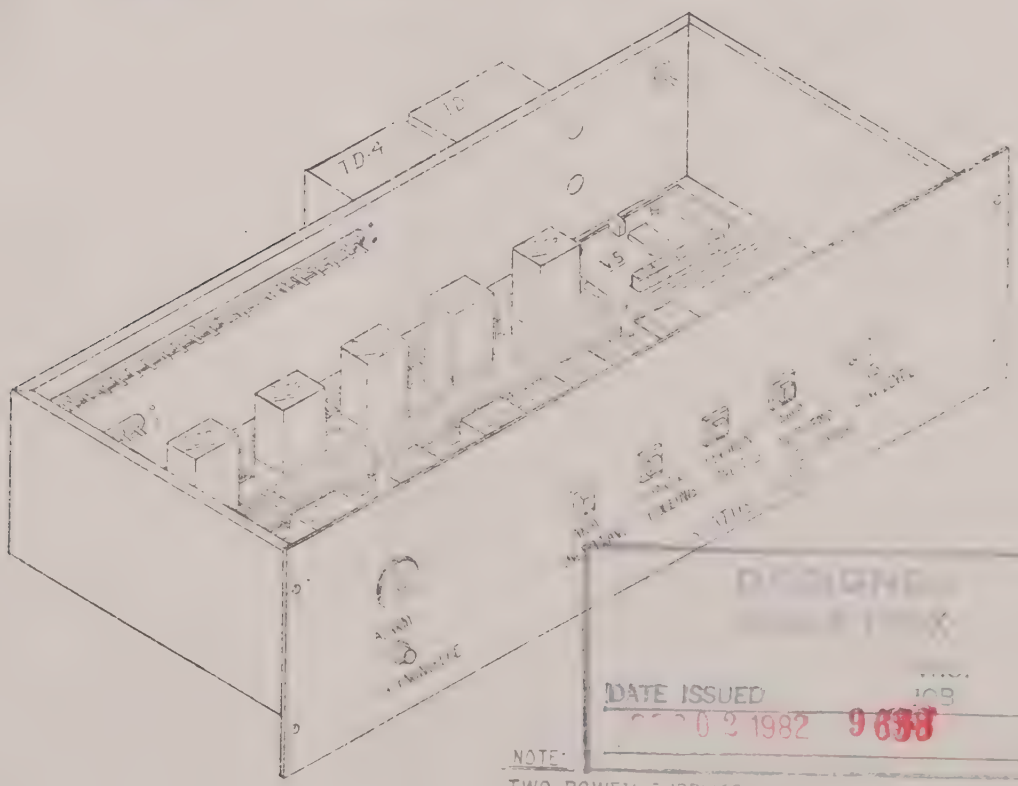
DS-4000
ELECTRICAL
29-8376 460V


+15V COM -15V
5 4 3
PS
POWER SUPPLY
3 COND CABLE
RED BLK GRN
J1
RED
BLK
OUTPUT
(73)
(74)
(REF LINE 8)
VIBRATION LOW LEVEL (SET TO TRIP BELOW 1/2G)
SEE DWG. # I-2082-QQ(X)
FOR CALIBRATION INSTRUCTIONS
2 COND. CABLE (CO-AXIAL)
SET 100 SEC
TDS-1
TDS
1CR
3CR
(73)
(74)
VS
VIBRATION LOW LEVEL
(75)
R
AMPLIFIER
LEVEL MONITOR
SHAKER
AS
SR AUX
FP
ACR
VIBRATION LOW
8, 9, 29
AMPLIFIER OVER
AND CURREN
11, 12, 25
LEVEL MON
14, 15, 26
ARMATURE
20, 21, 29
SHAKER ALA
ALARM ACK
22, 24









DESIGNED
DATE ISSUED
0 2 1982
JOB
9698

NOTE:
TWO POWER SUPPLIES IN BOX
120 VAC AND 24 VAC ALARM
CIRCUIT

MOTRON
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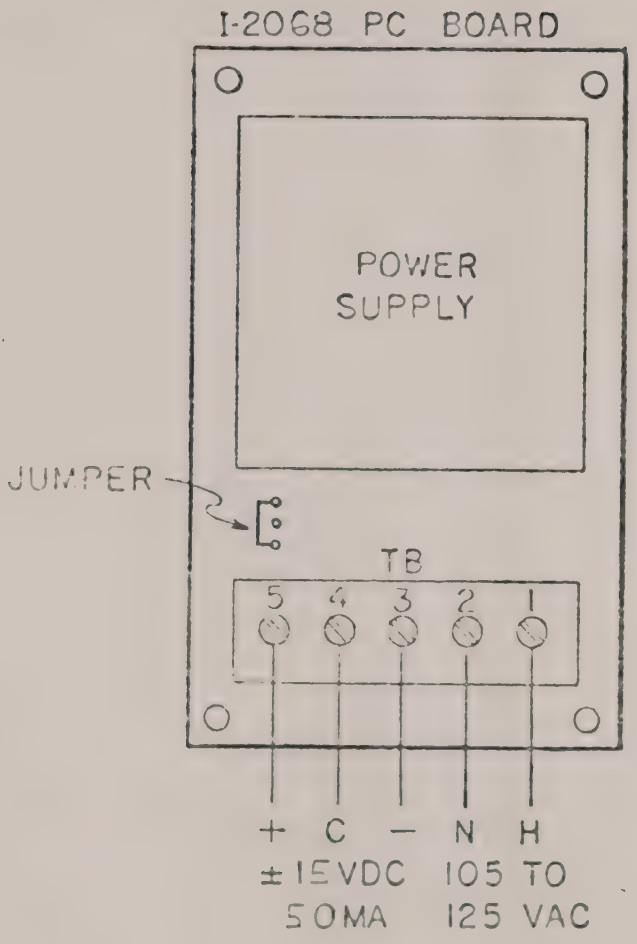
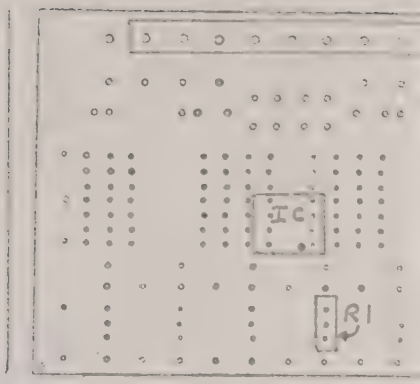
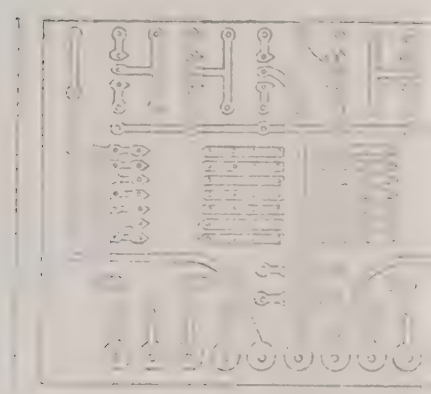
MICHIGAN 49423


I-2068 PC BOARD
POWER
SUPPLY
JUMPER
TB
5
4
3
2
1
+
C
—
N
H
±15VDC
50MA
105 TO
125 VAC

2-15.	± 15 VDC 50 MA POWER SUPPLY			1
P2A-5	5 TERM - TERMINAL STRIP		17A501	1

TOP





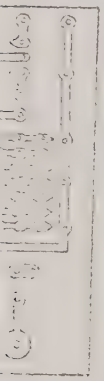
BOTTOM

CALIBRATION PROCEDURE

WITH THE ±15 VDC POWER SUPPLY TURNED ON ADJUST
THE DESIRED +5VDC ON PIN 6 OF THE "IC" THAT
TO THE DESIRED MINIMUM G LEVEL ON THE SC
THAT IS EMPLOYED SEE TABLE TO THE RIGHT

HOLLAND, MICHIGAN 49423

SYMBOL	DESCRIPTION	PART NO.	QTY
BOARD	P.C. BOARD	527790	1
TB	TERMINAL STRIP	176005	1
SOCKET	8 PIN DIP SOCKET	175008	1
SOCKET	14 PIN DIP SOCKET	175004	1
K	REED RELAY 5VDC	111001	1
IC	OP AMP LM358N	093021	1
Q1	TRANSISTOR 2N2222	083015	1
R1	TRIM POT 1 KΩ	054002	1
R2	RESISTOR 14kΩ/¼W	052415	1
R3	RESISTOR 1KΩ/¼W	052301	1
R4	RESISTOR 330Ω/1W	051238	1



CALIBRATION SCALE

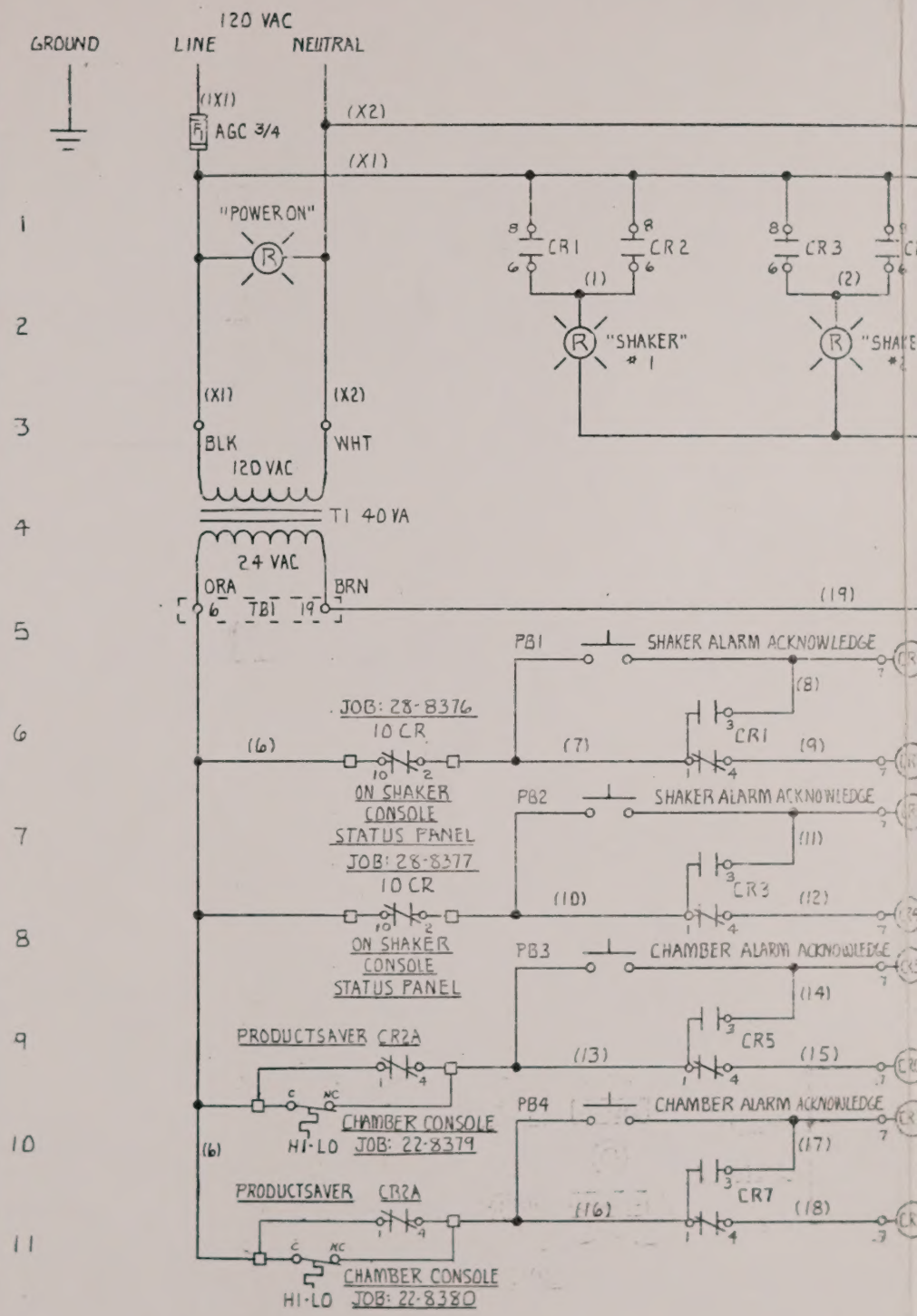
MVEC TO PIN 3	16 SCALE G-LEVEL	46 SCALE G-LEVEL	100 SCALE G-LEVEL	400 SCALE G-LEVEL
50	0.05	0.20	0.50	2
100	0.10	0.40	1.00	4
150	0.15	0.60	1.50	6
200	0.20	0.80	2.00	8
250	0.25	1.00	2.50	10
300	0.30	1.20	3.00	12
350	0.35	1.40	3.50	14
400	0.40	1.60	4.00	16
450	0.45	1.80	4.50	18
500	0.50	2.00	5.00	20
550	0.55	2.20	5.50	22
600	0.60	2.40	6.00	24
650	0.65	2.60	6.50	26
700	0.70	2.80	7.00	28
750	0.75	3.00	7.50	30
800	0.80	3.20	8.00	32
850	0.85	3.40	8.50	34
900	0.90	3.60	9.00	36
950	0.95	3.80	9.50	38
1.0 VOLT	1.00	4.00	10.00	40

DESIGNER
ROGER COOK
DATE RECEIVED
DEC 02 1982 9698

'1' FOR
RESPONDS
(1,4,10,40,G)

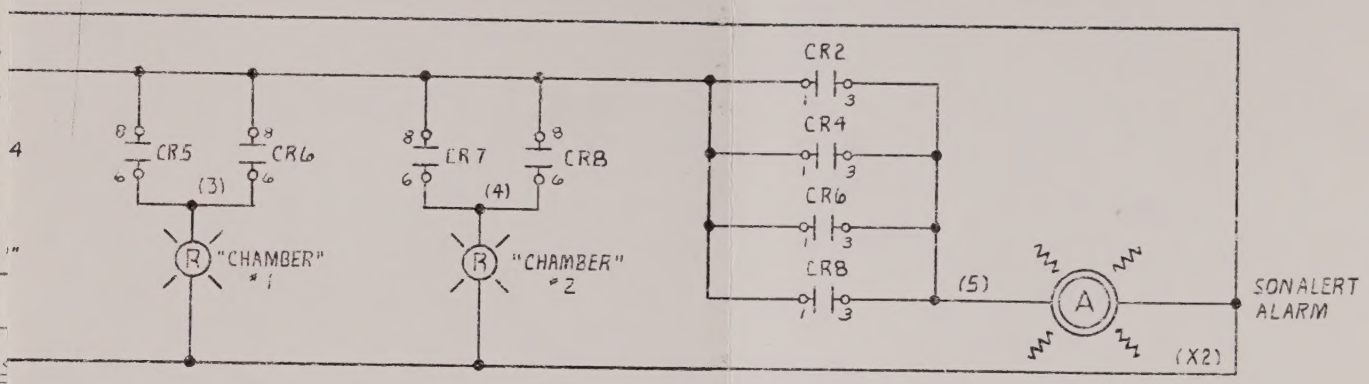
VERS. No. 2

I-208200 X



□-TB1 TERMINALS.

THERMOTRON
CORPORATION
HOLLAND, MICHIGAN 49423



(INSIDE BOX) TB1 - G | IX1 | X1 | X2 | X2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | S | S

6, 6, 1

SYSTEM 1

1, 1

7, 8, 1

SYSTEM 2

1, 1

9, 9, 1

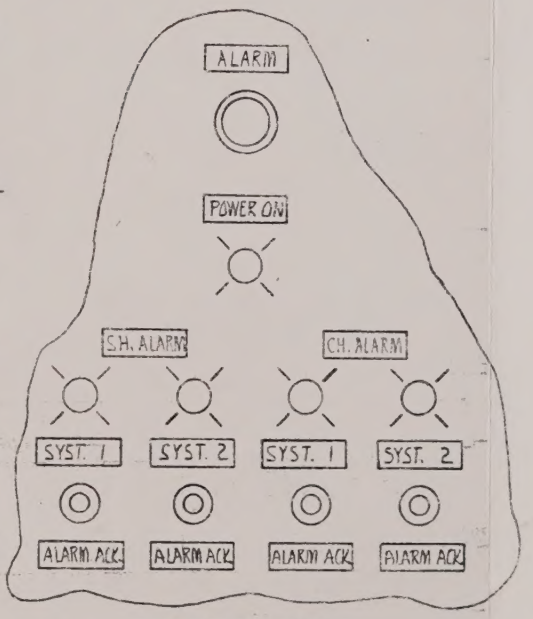
SYSTEM 1

1, 2

10, 11, 1

SYSTEM 2

1, 2



DOOR TAB LAYOUT

DESIGNER
ROGER COOK
DATE ISSUED DEC 02 1982
W.O. 9638

NOTES:

1. USED WITH CHAMBER SCHEMATIC # E-22-8379-1(W).
2. USED WITH SHAKER SCHEMATIC # E-1141-8376(W) & E-1141-8377(W).
3. REF. STATUS PANEL DWG. # DS-2046-9368(W).
4. REF. INTERCONNECT DWG. # DS-9638-3(X).
5. REF. MONITOR OVERALL DWG. # DS-9638-2(Y).

ITT

NO.	CHANGES	DATE	BY	CH'K'D

TOLERANCE

SCALE

MATERIAL

FINISH

DRAWN BY R. A. COOK DATE 11-23-82

CHECKED BY RWH DATE 11-30-82

RELEASED BY DATE

DESCRIPTION
MONITOR BOX
REMOTE ALARM SYSTEM
JOB: 28-9638

DRAWING NO. DS-9638-1

SIZE X

THERMOTRON

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TWX 810-292-6164